

**HEALTH, SAFETY, ENVIRONMENTAL AND REMEDIATION  
WEEKLY REPORT  
Williams AFB ST012**

Site No.: 9101-11-0001

**Week Ending 2 September 2016**

**I. SITE SUBCONTRACTOR SUMMARY**

Company	Sat	Sun	Mon	Tue	Wed	Thu	Fri
Amec Foster Wheeler			X	X	X	X	X
Terra Therm							
MP Environmental							
Yellow Jacket							

**II. SCHEDULE / SITE ACTIVITIES REVIEW**

- A. SEE Demolition - None**
- B. Well Drilling and Development - None**
- C. EBR Construction - None**
- D. Sampling/Monitoring**
  - Perimeter well monitoring
  - SEE/EBR well LNAPL monitoring/removal
- E. SVE System Operation/Optimization**
  - Routine operation
  - Operated the flame-oxidizer in parallel with the thermal oxidizer.
    1. There were no thermal oxidizer shutdowns due to alarm conditions this week.
    2. There were two shutdowns of the flame oxidizer due to flame failure.
      - a. On 29 August 2016, a flame failure alarm was caused by low oxygen forcing a system shutdown. The flame oxidizer was restarted successfully.
      - b. On 31 August 2016, a flame failure alarm caused by strong wind forcing a system shutdown. The flame oxidizer was restarted successfully.



- (a) Calculated destruction efficiencies are calculated using a single sampling event for each quarter, not using the average influent and effluent results.
- (b) Mass and volumes are calculated based on laboratory data for TPH reported as JP-4. As has been the basis for previous calculations at ST012, the average molecular weight of TPH as JP-4 is assumed equivalent to xylene (106.168 grams per mole). The assumed liquid density of the fuel is 6.57 lbs per gallon.
- (c) The PID correction factor for the 23 May 2016 sample was anomalous compared to historical values. An average of correction factors from samples before and after this date was used.
- (d) Inconsistent influent PID and flow rate measurements have been observed during system monitoring and are being investigated for the root cause and potential resolution.

## B. Flame Oxidizer Destruction Efficiency/Mass Removal Summary

The destruction efficiency and mass removal calculations for the flame oxidizer are tabulated below. A correction factor was applied to PID readings based on available analytical data and corresponding PID data. This factor is updated each time new analytical data is available and may retroactively alter previously reported data.

Date Period Began	Date Period Ended	Days in Period	Time Flame Oxidizer Operated <sup>(a)</sup>	Flame Oxidizer Uptime <sup>(a)</sup>	Date of Influent Laboratory TPH Result	Influent Concentration (PID) <sup>(a)</sup>	Influent Concentration (Adjusted PID)	Effluent Concentration (PID)	Effluent Concentration (Adjusted PID)	Calculated Destruction Efficiency <sup>(b)</sup>	Flowrate into Oxidizer (End of Period) <sup>(a)</sup>	Estimated VOC Mass Removed <sup>(c)</sup>	Average Daily Removal Rate <sup>(a)</sup>	Estimated VOC Mass Released to Atmosphere <sup>(a)</sup>	Average VOC Mass Released to Atmosphere <sup>(a)</sup>
---	---	days	hrs	%		ppmv	mg/m <sup>3</sup>	ppmv	mg/m <sup>3</sup>	%	sfcfm	lbs/period	lbs/day	lbs/period	lbs/day
8/4/2016	8/11/2016	7	107	64%	8/4/2016	509	12,666	17.1	1.1	99.99%	768	3,898	557	0.3	0.05
8/11/2016	8/18/2016	7	91	54%	8/4/2016	428	10,650	16.4	1.1	99.99%	768	2,788	398	0.3	0.04
8/18/2016	8/25/2016	7	78	46%	8/4/2016	483	12,019	8.9	0.6	100.00%	838	2,942	420	0.1	0.02
8/25/2016	9/1/2016	7	112	67%	8/4/2016	433	10,774 *	5.6	0.4	100.00%	768	3,472	496	0.1	0.02

Notes:

% - percent  
 hrs - hours  
 JP-4 - jet petroleum fuel grade four  
 lbs - pounds  
 mg/m<sup>3</sup> - milligrams per cubic meter  
 ppmv - parts per million by volume

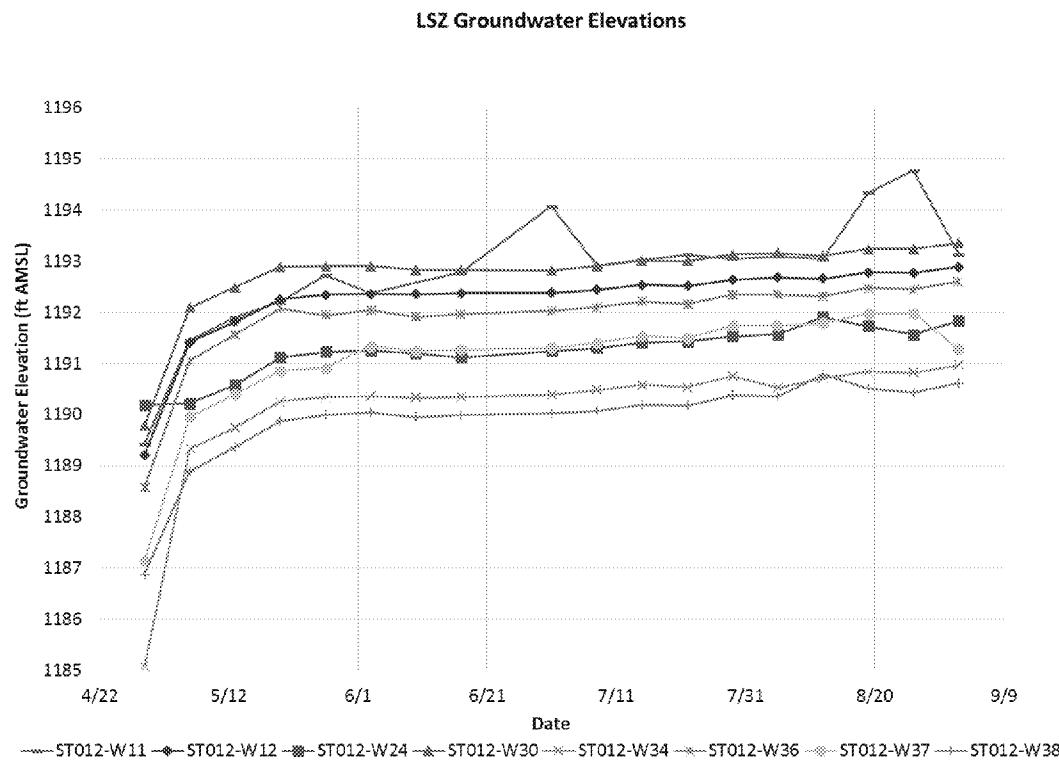
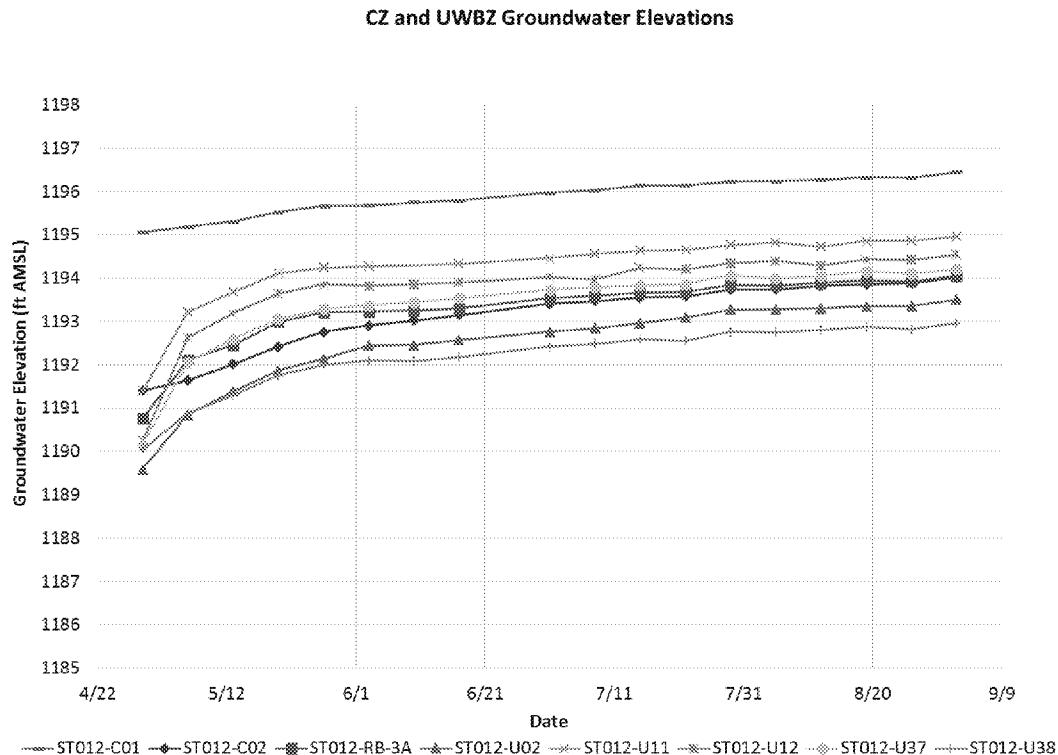
scfm - standard cubic feet per minute  
 TPH - total petroleum hydrocarbons  
 PID - photoionization detector  
 SVE - soil vapor compound  
 VOC - volatile organic compound

\* Concentration and associated calculated values may change after receipt of subsequent analytical data.

- (a) Discrepancies in runtime clocks for the flame oxidizer have been observed since restart. The system is being observed and diagnosed. The primary blower hours are currently used to calculate uptime.
- (b) Calculated destruction efficiencies are calculated using a single sampling event for each quarter, not using the average influent and effluent results.
- (c) Mass and volumes are calculated based on laboratory data for TPH reported as JP-4. As has been the basis for previous calculations at ST012, the average molecular weight of TPH as JP-4 is assumed equivalent to xylene (106.168 grams per mole). The assumed liquid density of the fuel is 6.57 lbs per gallon.
- (d) An error in hour recording caused an anomaly in hours that the flame oxidizer operated for the weeks ending 25 August and 2 September. The operation hours were estimated based on the flame oxidizer temperature chart recorder.
- (e) Inconsistent influent PID and flow rate measurements have been observed during system monitoring and are being investigated for the root cause and potential resolution.

#### IV. GROUNDWATER ELEVATION MONITORING

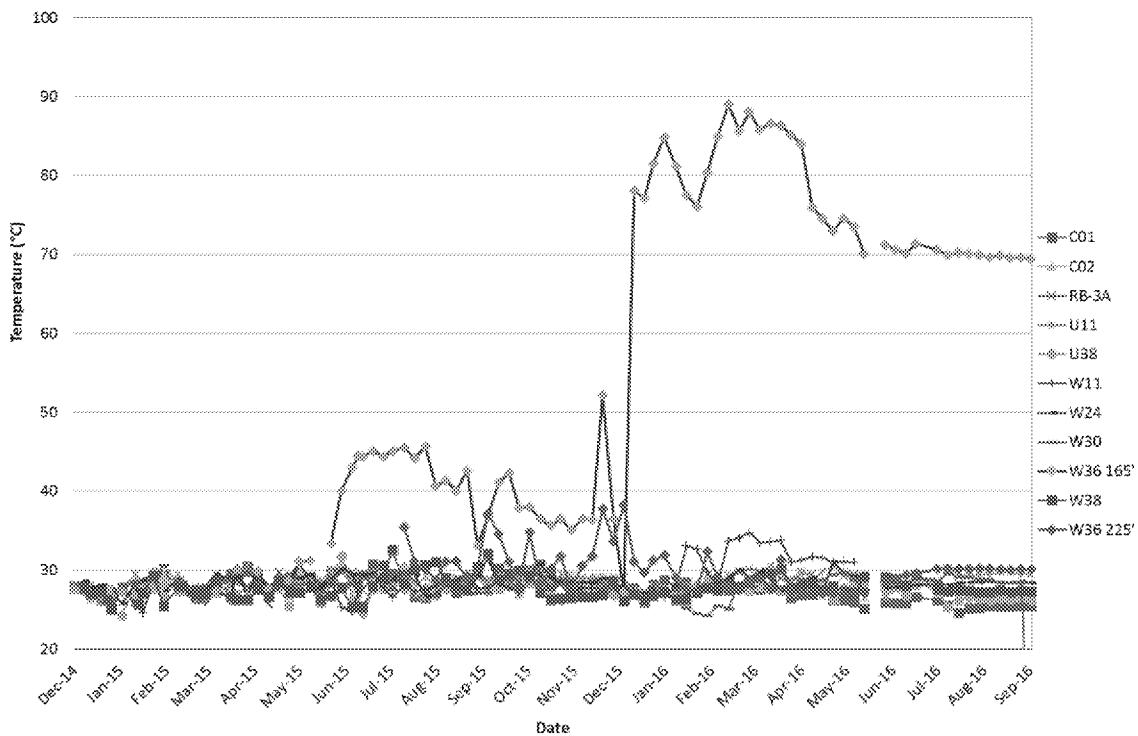
Groundwater elevations monitored since the shutdown of the final extraction phase of SEE (29 April 2016).



Note: Increased groundwater elevation in ST012-W11 on 19 August and 26 August 2016 are suspected to be influenced by LNAPL in the monitoring well caused by malfunctioning measuring equipment. The equipment is being serviced.

## V. SUBSURFACE TEMPERATURE MONITORING

### A. Perimeter Monitoring Well Temperatures



Note: Thermocouples are measured at approximate depths as follows (in feet below top of casing): C01=162; C02=168; RB-3A=161; U11=180; U38=164; W24=230; W30=231; W36=225; W11=228; and W38=228.

## VI. SEE TEMPERATURE MONITORING POINTS

The following table shows the temperatures recorded from the existing SEE temperature monitoring point (TMP) locations with manual data recording. The existing SEE TMPs no longer have data logging capabilities. This table will be updated periodically with new TMP data.

### A. TMP Readings Taken 9/2/2016

Depth (ft BTOC)	TMP01 (°F)	TMP02 (°F)	TMP04 <sup>(a)</sup> (°F)	TMP06 (°F)	TMP08 (°F)	TMP10 (°F)	TMP11 (°F)	TMP13 <sup>(c)</sup> (°F)	TMP16 (°F)	Boiling Point (°F) <sup>(b)</sup>
100	117		47	111	88	90	94	130	115	213
120			63		89	111	129		145	213
130					90	130	160	186	165	213
140	208		79	205	92	134	177		174	213
145					89		177	205	187	213
150	221		78	211	97		183		178	214
155		96			99	113	181	209	181	220
160	239	97	79		105	109	176		187	226
165					112	109	167	224	187	231
170	238	99	90	210	114	106	164		192	236
175		101			130	122	161	233	197	241
180	251	103	103	212	137	120	164		196	246
185		107			137	136	174	242	205	250
190		113	108		144	150	193		205	255
195		116			143	157	207	254	217	259
200			128		114	171	217		232	262
205		123			138	184	229	261	241	266
210		127	129		149	181	234		230	269
215		132			148	179	242	260	240	272
220		133	132		145	174	219		227	275
225		138			141	166	213	242	206	277
230		141	117		141	145	192		175	280
235		132			144	129	162	202	161	282
242		118		225	138	134	142		130	284

ft BTOC - feet below top of casing

°F – degrees Fahrenheit

<sup>(a)</sup> During SEE operations, TMP04 became non-functional as of June 2015. Data collected from this TMP will be closely monitored for erroneous readings.

<sup>(b)</sup> During SEE operations, TMP13 was compromised in March and July of 2015. Select sensors were repaired, however, readings from this TMP are very close to boiling and are considered suspect.

<sup>(c)</sup> Estimated boiling points by elevation are based on an assumed groundwater elevation of 149 ft below ground surface.

## VII. LNAPL MONITORING

### A. Perimeter LNAPL Thickness (ft)

Monitoring Well	8/12/2016			8/19/2016			8/26/2016			9/2/2016		
	Before bailing/ pumping	After Bailing/ pumping	Weekly Gallons Removed									
CZ/UWBZ Wells												
ST012-C01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-C02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UWBZ Wells												
ST012-U02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-U38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-RB-3A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LSZ Wells												
ST012-W11	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.08	0.00	15.00
ST012-W12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST012-W37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24	0.00	3.50
ST012-W38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**B. LNAPL Monitoring and Removal**

The table included with this report as Attachment 1 summarizes the removal and monitoring performed at LNAPL screened wells.

**VIII. WASTE GENERATION AND RECYCLING**

No site-derived waste or recyclable material was removed this week.

**IX. TWO WEEK LOOK AHEAD**

**A. SEE Demolition - None**

**B. EBR Construction - None**

**C. Well Drilling/Development - None**

**D. Sampling Activities**

1. Pumping and bailing to remove NAPL from SEE wells
2. Continued NAPL screening in SEE extraction and injection wells
3. Monitoring temperature monitoring points from existing TMPs used during SEE.

**E. SVE System Operation/Optimization**

1. Continue operation of flame oxidizer and thermal oxidizer with SVE system.
2. Add CZ06 to SVE system as vapor extraction well.

**X. ATTACHMENTS**

1. LNAPL Monitoring and Removal Table
2. LNAPL Screening Figures based on table in Attachment 1.

















LSZ50*	9/2/2016	Y	Y	144.20	146.44	2.24	Y	N	---	147.00	0.00	5
	7/8/2016	Y	N	---	149.00	---	N	N	---	---	---	0
	7/15/2016	Y	N	---	148.89	---	N	N	---	---	---	0
	7/29/2016	Y	N	---	148.71	---	N	N	---	---	---	0
	8/5/2016	Y	N	---	148.74	---	N	N	---	---	---	0
LSZ52*	9/2/2016	Y	N	---	148.50	---	N	N	---	---	---	0

NM = Not measured due to temperature interference.

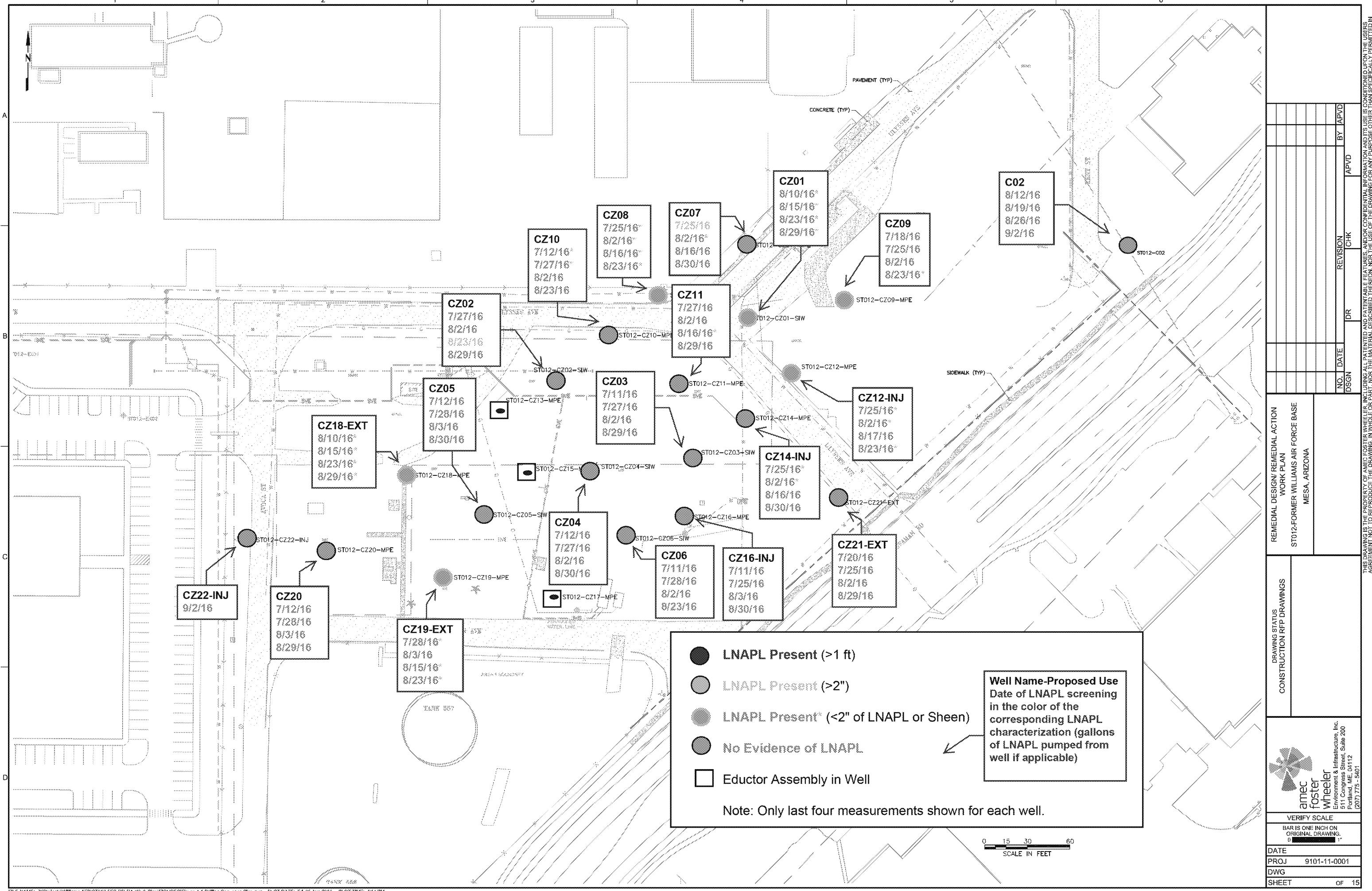
NR = Not recorded.

--- = No NAPL present. Measurement not performed.

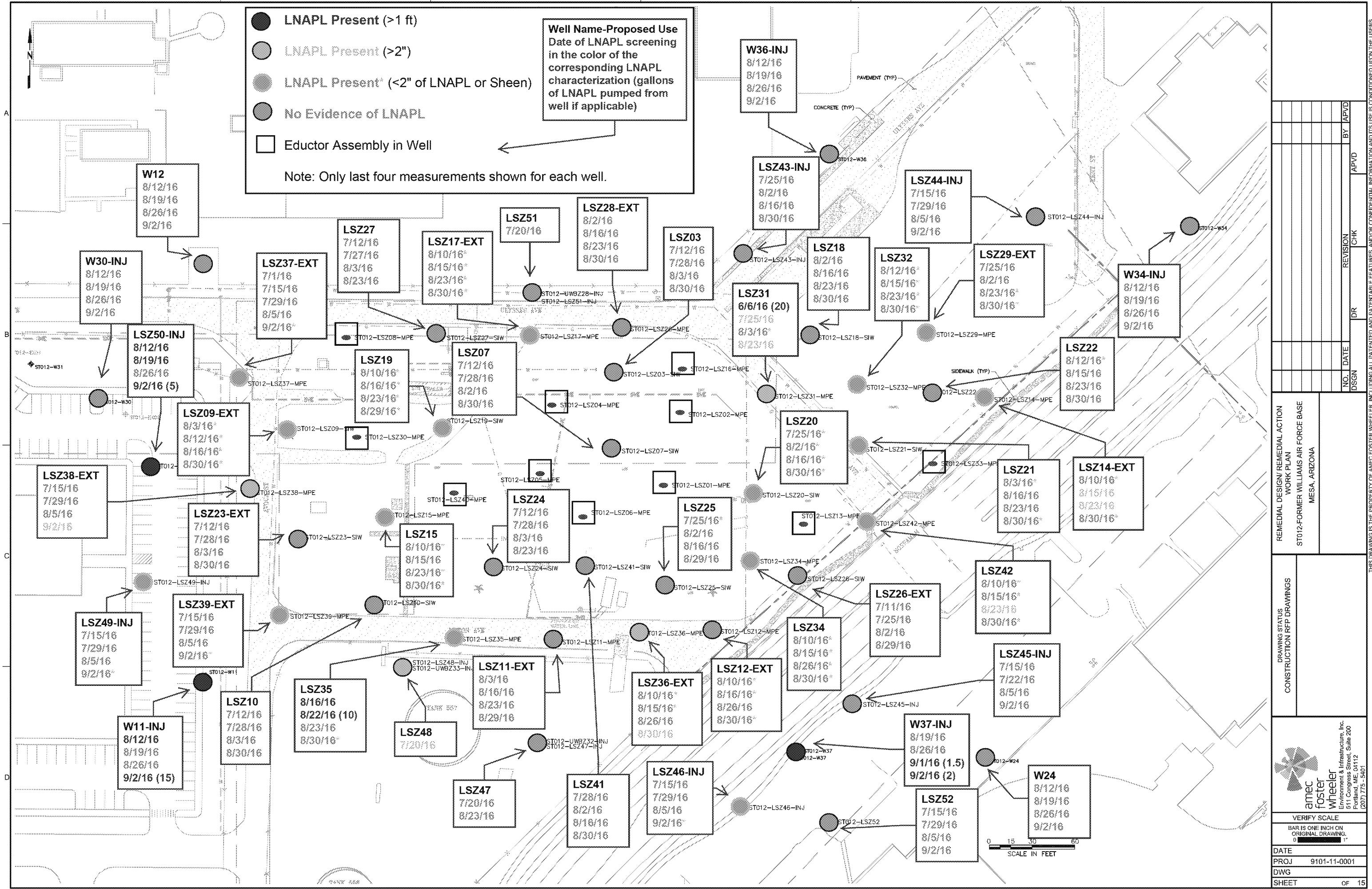
\* = Newly installed well.

Notes:

- (1) LNAPL estimated using PTFE bailer, not interface probe.
- (2) Depth measured using a bailer.
- (3) Depth measured using a tagline.
- (4) LNAPL recovered included water.
- (5) Dual screened well location monitored for LNAPL in the upper interval only.
- (6) Dual screened well location monitored for LNAPL in the lower interval only.







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